-197-

MITRAL REGURGITATION AS A COFACTOR IN MITRAL VALVE PROLAPSE
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OBJECTIVE: To assess whether mitral regurgitation in the setting of mitral valve prolapse identifies a subset of individuals at higher risk for arrhythmias.
DESIGN: Case series study
SETTING: Referral center for evaluating aviators with possible heart disease
PATIENTS: Military aviators (n=198) known to have mitral valve prolapse; evaluated and followed in the period from June 1983 to February 1991.
MEASUREMENTS: History, physical examination, echocardiography, Holter monitor, and other testing (including subspecialty evaluation) as required for a thorough aeromedical evaluation. Mitral regurgitation was considered present if there was a late systolic/holosystolic murmur that behaved appropriately with maneuvers and/or color-flow/continuous wave evidence for mild-/moderate/severe regurgitation on at least one evaluation.
RESULTS: The 198 aviators underwent 320 evaluations averaging 1.62 visits per subject. MR was noted on physical exam and/or echocardiography in 133 of these aviators. Some degree of MR (mild/moderate/severe) was noted on Doppler study in 31 aviators; 25 of these 31 aviators had auscultatory MR as well as MR by echo. The only arrhythmia significantly more common in individuals with MVP and MR was supraventicular pairs (12.7% with MR vs. 1.5% without MR, p=.01). Ventricular pairing, ventricular or supraventricular tachycardia, atrial fibrillation/flutter, etc. did not show a significant association with the MR group.
CONCLUSION: In this group of 198 aviators with MVP only PAC pairing was significantly more common in the subjects with MR as compared to those without MR. MR is not useful for identifying aviators with MVP who are at risk for tachyarrhythmias.

-198-

ASPECIFIC NASAL HYPERREACTIVITY IN AN AIR FORCE POPULATION AND ITS RELATIONSHIP WITH BRONCHIAL HYPERREACTIVITY AND ATOPY. L. Urbani*, R. Berti*, C. De Angelis, G. Petrelli, S. Farrace*, P.M. Matricardi, R. Nisini and F. Filiaci°. IAF, DASRS, Dept. of Aerospace Medicine and °ENT Clinic, University of Rome, Italy.

INTRODUCTION. Nasal function is of paramount importance for aircrew. Aspecific nasal hyperreactivity (ANH) prevalence in a young IAF population was investigated and compared to the prevalence of aspecific bronchial hyperreactivity (ABH) and atopy. METHODS. 90 healthy males (17-24 yrs) were administered cold water and methacholine nasal provocation tests (NPTs). ANH was evaluated by computerized rhinomanometry and, only for the methacholine NPT, by measurement of nasal secretions. A methacholine bronchial provocation test (BPT) was also performed, as well as a screening test for inhalant allergy (Phadiatop). RESULTS. 25% was positive to cold water NPT, 38% to methacholine NPT and 8% to both. BPT was positive in 18% and in more than 2/3 of cases ABH was associated with ANH to either NPTs. 24% was positive to Phadiatop and 91% in this group was positive to either NPT or BPT. CONCLUSION. ANH is more frequent than ABH, which is often associated to the former condition. Atopy seems to match very often with aspecific upper and/or lower airway hyperreactivity. Implications for selection of aircrew can follow.

-199-

Tissue oxygen tension in patients with peripheral occlusive arterial disease during simulated altitude exposure.
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INTRODUCTION. Tissue oxygen pressure values were determined in the tibial anterior muscles of the diseased legs of 10 patients suffering from intermittent claudication due to chronic occlusive arterial disease before and after 20 min. of exposure to an oxygen reduced gas mixture (115 mmHG pO_2) simulating an altitude of 8500 feet. METHODS. Oxygen pressure values (medians) were determined with a polarographic method according to Ehrly and Schröder using atraumatic micro-PT-needle electrodes. In addition transcutaneus pO_2 and pCO_2 (Radiometer, Kopenhagen), pulsoximetric O_2-saturation (Pulsox 7, Minolta) and blood gas analysis were performed (AVL, Schaffhausen, Switzerland). RESULTS. Arterial pO_2 decreased from 80.2 ±15,1 mm HG to 59,9 ±10,4 mm Hg, O2-saturation from 95 ±2,5 to 90 ±5,6%. Accordingly tissue oxygen tension in the tibial ant. muscle decreased from 6,5 mm Hg to 2,4 mm Hg. The pooled histograms were markedly shifted to the hypoxic to anoxic range. None of the patients complained of rest pain in the diseased leg. CONCLUSIONS. Exposure of patients with at rest compensated peripheral occlusive arterial disease of the leg led to a marked decrease of tissue pO_2 values without any evidence of clinical worsening, especially no rest pain. It may be discussed if rest pain in ischemic legs is due to low pO_2-values or to disturbed microcirculatory perfusion.

-200-

N95-16752

BLOOD VOLUME AND ORTHOSTATIC RESPONSES OF MEN AND WOMEN TO A 13-DAY BEDREST. *S. Fortney, T. Driscoll, L. Steinmann, and C. Alfrey. NASA Johnson Space Center, KRUG Life Sciences, and the Baylor College of Medicine.

INTRODUCTION. Changes in blood volume during space flight are thought to contribute to decrements in postflight orthostatic function. The purpose of this study was to determine whether gender affects red cell mass and plasma volume during a short exposure to simulated microgravity, and whether gender differences in orthostatic tolerance ensure. METHODS. Ten men (31.5 ± 5.2 yrs, STD) and eleven normally-menstruating women (33.3 ± 6.0 yrs, STD) underwent 13 days of 6° head-down bedrest. Plasma volume (^{125}I-labelled human serum albumin) and red cell mass (^{51}C-labelled red blood cells) were measured before bedrest and on bedrest day 13. On the same days, orthostatic tolerance (OT) was determined as the maximal pressure during a presyncopal-limited lower body negative pressure test. RESULTS. Plasma volume (PV) and red cell mass (RCM) decreased ($P < 0.01$) during bedrest in both groups, with a greater PV decrease ($P < 0.05$) in men (6.3 ± 0.6 ml/kg) than in women (4.1 ± 0.6 ml/kg). Decreases in red cell mass were similar (1.7 ± 0.2 ml/kg in men and 1.7 ± 0.2 ml/kg in women). OT was similar for men and women before bedrest (-78 ± 6 mmHg in men vs. -70 ± 4 mmHg in women) and decreased by a similar degree (by an average of 11 mmHg in both groups) after bedrest. The changes in OT did not correlate with changes in plasma volume during bedrest ($r^2 = 0.002$). CONCLUSION. Thus, although female hormones may protect PV during bedrest, they do not appear to offer an advantage in terms of loss of orthostatic function.

-201-

N95-16753

EFFECT OF ANTIORTHOSTATIC BEDREST (BR) ON GASTROINTESTINAL MOTILITY (GIM) OF NORMAL SUBJECTS L. Putcha[1*], R.P. Hunter[2], K.J. Tietze[3], and N.M. Cintrón[1*] [1]Biomedical Operations and Research Branch, NASA/Johnson Space Center, Houston, TX, [2]KRUG Life Sciences, Inc., Houston, TX and [3]Philadelphia College of Pharmacy and Science, Philadelphia, PA

INTRODUCTION. The combined effect of postural changes, fluid shifts, and diuresis associated with the absence of the gravity vector may decrease GIM during space flight. GIM can be estimated from the mouth-to-cecum transit time (MCTT) of orally administered lactulose (LAC); this test is used to assess changes in GIM in normal subjects and in patients with GI pathology and related disease conditions. Since BR mimics some of the physiological changes that occur during space flight, the effect of ten days of BR on GIM was evaluated from the MCTT of LAC. METHODS. Subjects were 12 nonsmoking males between the ages of 35 and 50. After an 8-10 h fast, subjects ingested Cephulac® (20g solution) with a low-fiber breakfast on four different days (45, 30, 25, and 20) before BR and on three separate days (4, 7, and 10) during BR. Breath-H_2 concentrations were measured before and at 10-min intervals for 4 h after breakfast using a Quintron breathalyzer® and MCTT was determined from these data. RESULTS. MCTT ranged between 50 and 100 min during ambulation and 80 and 210 min during BR with means of 79 min and 122 min, respectively. CONCLUSIONS. Mean MCTT during BR was 54% longer than during ambulation, suggesting that absorption and availability of orally administered medications and nutrients may be delayed or impaired as a result of decreased GIM during bedrest.

-202-

THE EFFECTS OF LYPRESSIN ON HEMODYNAMIC RESPONSES TO HEAD-DOWN TILT AND ORTHOSTATIC STRESS. D.F.Ward* and R.W.Gotshall*. Wright State University School of Medicine, Dayton, OH 45401.

INTRODUCTION. This study was conducted to assess the effects of the synthetic drug lysine-8-vasopressin (lypressin) on specific hemodynamic variables during nascent (4 hours) head-down tilt (HDT) and subsequent orthostatic stress. METHOD. Seven healthy male subjects, ages 23-37, participated in a blinded, cross-over study of lypressin versus the control, normal saline nasal spray, administered intranasally immediately before and two hours after beginning a 6 degree head-down tilt. Plasma volume, urine flow and cardiovascular dynamics were assessed by venous hemoglobin/hematocrit, urine volumes, electrocardiography, impedance cardiography and plethysmography measurements before, during, after tilt, and in response to a 10 minute stand test. RESULTS. In the lypressin trial, stroke volume, cardiac output and index, basal impedance, and pulse pressure were significantly decreased ($p<0.05$) while total peripheral resistance was increased at the end of tilt. Plasma volume change showed a significant increase of 5.9% by the end of tilt in the lypressin trial ($p<0.005$), while in the placebo group there was no significant change. Clinical observations included pre-syncopal symptoms in three of the seven control trial subjects versus none of the lypressin trial subjects during post-tilt stand testing. Post-tilt stand tests showed that mean arterial pressure was maintained at a higher value in the lypressin trial compared to baseline stand test. The pulse time index and cardiovascular index of deconditioning showed a significant increase for placebo subjects after tilt and no significant change from pre-tilt with lypressin subjects. CONCLUSIONS. The cardiovascular system adapts to a new steady-state during 4 hours HDT that is maladaptive when provoked with orthostatic stressors. Exogeneous vasopressin analogue ameliorates the deleterious effects of post-tilt stand testing by maintaining the intravascular volume at greater than pre-tilt values and increasing mean arterial pressure via peripheral resistance.